## AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listing, of claims in the application:

1. (Original) A conductive compound of formula (I) below:

$$HS + (CH_2)_1 C S m (CH_2)_n Y - R$$

wherein Y is a carbonyl or -NH-; R is one of H, OH, a leaving group, and a probe group; I is an integer from 3 to 6; m is an integer from 1 to 4; and n is an integer from 0 to 3.

- 2. (Original) The conductive compound of claim 1, wherein the probe group is a nucleic acid or a protein.
- 3. (Original) The conductive compound of claim 2, wherein the probe group is selected from the group consisting of a deoxyribonucleic acid (DNA), a ribonucleic acid (RNA), a peptide nucleic acid (PNA), an antibody, an antigen, an enzyme, a cofactor, and a substrate.
- 4. (Original) A method of synthesizing the conductive compound of said formula (I) of claim 1 by reacting a compound of formula (IV) below with thiourea:

wherein Y is carbonyl or -NH-, R is one of H, OH, a leaving group, and a probe group, X is halogen atom, l is an integer from 3 to 6, m is an integer from 1 to 4, and n is an integer from 0 to 3.

5. (Original) A method of synthesizing the conductive compound of formula (I) of claim 1, comprising reacting a compound of formula (V) below with a compound of formula (VI) below:

HS 
$$+(CH_2)_1$$
  $C$   $S$   $+ C$   $S$   $+ C$   $S$   $+ C$   $S$   $+ C$   $+ C$   $S$   $+ C$   $+$ 

wherein R1, R2, and R3 are independently  $C_1$ - $C_8$  alkyl groups; Y is carbonyl or -NH-group; R is one of H, OH, a leaving group, and a probe group; X is a halogen atom; l is an integer from 3 to 6; m1 and m2 are integers from 1 to 4 and  $2 \le m1 + m2 \le 4$ ; and n is an integer from 0 to 3.

- 6. (Original) An electrode coated with the conductive compound of said formula (I) of claim 1, the electrode being made of gold.
- 7. (Original) A sensor including an electrode coated with the conductive compound of said formula (I) of claim 1, the electrode being made of gold.

8. (Original) A target molecule detection method comprising:(a) immobilizing a compound of formula (I) below on a gold substrate to form a self-assembled monolayer;

$$HS + (CH_2)_1 C CH_2 M (CH_2)_n Y - R$$
...(I)

wherein Y is a carbonyl or -NH-; R is one of H, OH, a leaving group, and a probe group; I is an integer from 3 to 6; m is an integer from 1 to 4; and n is an integer from 0 to 3;

- (b) reacting a surface of the self-assembled monolayer with probes;
- (c) contacting a target molecule capable of specifically binding to the probes with the probes in the self-assembled monolayer; and
  - (d) measuring an electrical signal from the target molecule-probe complex.
  - 9. (Original) A target molecule detection method comprising:(a) immobilizing a compound of formula (I) below on a gold substrate to form a self-assembled monolayer;

$$HS + (CH_2)_1 C CH_2 M (CH_2)_n Y - R$$

wherein Y is a carbonyl or -NH-; R is one of H, OH, a leaving group, and a probe group; I is an integer from 3 to 6; m is an integer from 1 to 4; and n is an integer from 0 to 3;

- (b) contacting a target molecule capable of specifically binding to a probe group R in formula (I) with the probes in the self-assembled monolayer; and
  - (c) measuring an electrical signal from the target molecule-probe comlex.
- 10. (Currently Amended) The method of claim 8-or 9, wherein the electrical signal is measured from voltage or current variations.

- 11. (Currently Amended) The method of claim 8 or 9, wherein the probes or the probe group is selected from the group consisting of a deoxyribonucleic acid (DNA), a ribonucleic acid (RNA), a peptide nucleic acid (PNA), an antibody, an antigen, an enzyme, a cofactor, and a substrate.
- 12. (Currently Amended) The method of claim 8-or-9, wherein the target molecule is a nucleic acid or a protein.
- 13. (New) The method of claim 9, wherein the electrical signal is measured from voltage or current variations.
- 14. (New) The method of claim 9, wherein the probes or the probe group is selected from the group consisting of a deoxyribonucleic acid (DNA), a ribonucleic acid (RNA), a peptide nucleic acid (PNA), an antibody, an antigen, an enzyme, a cofactor, and a substrate.
- 15. (New) The method of claim 9, wherein the target molecule is a nucleic acid or a protein.